

We claim:

1 1. A supersonic air inlet, wherein substantially all of the
2 air compression takes place within said inlet, incorporating a
3 shock stability bleed system, and comprising external surfaces
4 that are substantially aligned with the airflow approaching the
5 inlet in order to minimally contribute to the sonic boom
6 signature of an aircraft.

1 2. An inlet according to claim 1 further comprising a
2 stability bleed system that is comprised of bleed regions on the
3 interior surfaces of the inlet exiting into bleed plenums with
4 fixed or variable-exit area control valves, that provides the
5 inlet with the necessary tolerance to changes in engine mass-
6 flow demand or external disturbances (changes in incoming flow
7 angularity or speed), and which prevents inlet unstart under
8 such adverse conditions.

1 3. An inlet according to claim 2, further comprising
2 variable cowl surface geometry to provide the variation in
3 surface geometry and throat area necessary for optimum inlet
4 performance and meeting the propulsion system's off-design mass-
5 flow demand schedule.

1 4. An inlet according to claim 3 which is two-dimensional
2 or axisymmetric.

1 5. An inlet according to claim 4 wherein interior
2 surfaces of said inlet are composed of a series of distinct
3 compression angles, or form a substantially isentropic
4 compression system between said inlet initial angled compression
5 surface and throat of said inlet.

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1 6. An inlet according to claim 5 wherein the downstream
2 exterior inlet surfaces may be maintained as a rectangular
3 cross-section or transitioned to a round nacelle.

1 7. An inlet according to claim 6 wherein said external
2 surfaces are aligned with the flow of air to the inlet, and
3 interior surfaces at the entrance of the inlet are at an angle
4 of about 2° to 5° to said flow.

1 8 An inlet according to claim 6 wherein said external
2 surfaces are within about 5° of parallel to the flow of air to
3 the inlet, and interior surfaces at the entrance to the inlet
4 are at angles of about 3° to 10° to said flow.

1 9. An inlet according to claim 6, wherein external
2 surfaces that are not aligned with the flow consist of a small
3 initial surface angle on the external sidewall and 0° flow
4 aligned internal sidewall surfaces thus eliminating internal
5 sidewall compression and three-dimensional internal flow.

1 10. A inlet according to claim 1 wherein: substantially
2 all compression shocks are reflected on the internal surfaces;
3 and cowl leading edges are staggered in accordance with off-
4 design Mach number spillage considerations.

1 11. An inlet according to claim 10 wherein a single
2 bifurcated inlet is derived by joining the exterior surfaces of
3 the longer cowl of two inlets of claim 9 to form a back-to-back
4 arrangement with the duct from the throat of each resulting
5 supersonic diffuser being transitioned to a semicircle at the
6 exit to jointly form a round entrance for a single engine.